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Brad R Close

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P. 10

FROM :

FAX NO. :4123731720

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10/618,111  
February 24<sup>th</sup>, 2005  
Declaration Under 37 CFR 1.132

Via Facsimile

Appl. No. : 10/618,111  
Inventor : Smith, James D  
Filed : 07/11/2004  
A.U. : 1712  
Examiner : Feely, Michael J  
Client Ref: 2003P08574US

Commissioner for Patents  
P.O. Box 1450  
Alexandria VA 22313-1450

**Declaration of James D. Smith  
Under 37 CFR 1.132**

Sir:

I, James D. Smith, hereby declare as follows:

1. I have studied 8 years at Aberdeen University, Scotland and Syracuse University, NY. I have worked for Siemens Westinghouse Power Corp. for 35 years in the areas of High Voltage Electrical Insulation Polymers for motors and generators.
2. I am the first named inventor on the pending patent application as well as on the primary prior art cited in the January 26<sup>th</sup>, 2005 office action, namely 5,904,984 (Smith '984). I have thoroughly read and am intimately familiar with all information disclosed in this source as well as the secondary reference of Cook 6,369,183 (Cook '183).
3. One of ordinary skill in the art would not combine Cook '183 with Smith '984.
4. First off, it was unexpected that liquid crystal thermoset (LCT) resins could be used in any manner as enhanced thermally conductive resins. Generally the better a resin is at electrical insulation, the better it is at thermal insulation. So the combination of anything with LCT resins to produce a resin with the thermal conductivity we obtained,

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at least 0.50 W/mk in the transverse direction and at least 0.99 W/mK in the thickness direction, was very interesting.

5. More specific to the issue of Cook '183 with Smith '984, is that a practitioner in my field would not expect to be able to mix any significant amount of materials in with an LCT resin and maintain the crystalline micro-structure that give the cured resin its electrical insulation properties (dielectric strength). What make the LCT a good electrical insulation is the highly organized crystalline micro-structure that it achieves when curing. Fillers, such as alumina, are relatively large materials that disrupt crystalline formation, especially at the large 15-65% wt. quantities described in the application.

6. Myself and my colleagues did experiments on the effect of adding fillers, such as alumina and silica, to the LCT epoxies and noticed that we had a deleterious effect on both physical and electrical properties as shown by a significant drop in HDT (heat distortion temperature) and dielectric strength due to the disruption of the crystalline structure.

7. By mixing the alumoxanes of Cook '183 with the LCT of Smith '984 one would expect to get, and would in all likelihood end up with, a ruined LCT resin that has disrupted crystalline domains and phase separation with the added alumoxanes. This disruption in crystalline structure and phase separation would result in the degradation of the high performance properties of a LCT epoxy resin.

Dated this 24th day of February, 2005

Monroeville, PA

  
James D. Smith